Biological Evaluation of a Tent Caterpillar

(Malacosoma sp.) Infestation in

Zion National Park, 1967

The purpose of this evaluation report is to describe the current status of a tent caterpillar (Malacosoma sp.) infestation on Fremont poplar, Populus Fremontii, which has persisted in Zion National Park and the Virgin River Valley for over 30 years. Control of the infestation has been undertaken in Zion National Park for about the past 15 years. A microbial insecticide, Bacillus thuringiensis, var. thuringiensis, was used as the controling agent in recent years. Although annual control efforts were relatively successful, a residual insect population has persisted requiring repeated control applications on at least a limited basis.

In 1966, a marked decline in the infestation was attributed to artificial control, predation, parasitism, and possibly a virus. Egg masses sampled toward the end of 1966 indicated only light defoliation the following season. The 1967 growing season did, in fact, result in considerably lower larval populations and, consequently, only light defoliation occurred in most susceptible areas within the Park.

Larvae which did emerge and feed during 1967 were reduced to an acceptable level by the Park's control efforts. It is noteworthy that one particular area supported a substantial number of feeding larvae even after treatment. Park personnel reported that a similar situation had been observed in this tree group in previous years.

In November, well after moth flights and egg deposition had been completed, Bruce Baker and Otto Sandin sampled tent caterpillar egg masses as an index of the degree of defoliation that can be expected in 1968. Egg mass density was compared with an evaluation system developed for the Great Basin tent caterpillar on aspen by the Forest Insect Laboratory in Albuquerque, New Mexico. Egg mass counts as related to predicted defoliation of aspen follow:

Average No. New Egg Masses Per Two 30-Inch Aspen Branches	Predicted Defoliation
0.1 to 0.7	Light
1.2 to 1.7	Moderate
2.5 or more	Heavy

Egg masses were collected from four 30-inch branches on each of 68 trees within the Park. The sample trees were selected from the following areas:

Area	Location in Park
1	N.P.S. Administration Building
2	Ranger Home Group (Oak Creek)
3	New Campgrounds and Amphitheater
4	Large Campground in Vicinity of Vehicle Service Station
5	Road to Zion Lodge (Across from "Court of the Patriarch" viewpoint)
6	Road to Zion Lodge (0.1 Mile North of Tunnel Road)

The relationships between the egg survey and defoliation which is expected in 1968 is as follows:

Area	No. Trees Sampled	No. Branches Sampled	No. of 1967 Egg Masses	Average No. New Egg Masses per Two 30-Inch Branches	Expected 1968 Defoliation Based on 1967 Egg Counts
1	3	12	0	0	Light*
2	5	20	1	0.10	Light*
3	10	40	1	0.~~15~~ .05	Light*
4	25	100	24	0.48	Light
5	12	48	0	0	Light*
6	13	52	16	0.62	Light*
TOTAL	68	272	42	Overall Mean = 0.31	Light

Fall egg collections made in 1966 yielded an average of 0.22 egg masses per two-branch sample. The overall average number of eggs collected this past fall is 0.31. This indicates that last year's low overall population level will continue in 1968.

The predation of egg masses that was so prevalent in 1966 was not evident this past season. The reason for this is not readily apparent. The high degree of egg parasitism prior to 1967 egg emergence may also be evident prior to this spring's emergence of larvae. Parasites are just now beginning to emerge from laboratory egg populations; consequently, a quantitative value of parasitism cannot be determined at this time. Even though adult parasite emergence has not yet terminated, larval emergence in the laboratory has concluded with an average emergence of about 88 larvae per egg mass. This compares with 100 larvae reared from the average egg mass during the overwintering population of 1965-66.

Inasmuch as larval emergence is occurring, defoliation in the field can be expected. As mentioned earlier, however, the relative scarcity of egg masses in most parts of the Park indicates that damage in 1968 should be light. It is recommended that limited control using B. t. be carried out in areas where Park personnel observed the caterpillar in 1967. Such a control effort should minimize foliage loss and reduce the insect population as a recreational nuisance.

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* Projection of light defoliation is most meaningful for Area 4 and particularly for pooled data inasmuch as a minimum of 20 sample trees is desirable.